

WHAT IS CLAIMED IS:

1. An image processing method in a printing system including a plurality of processors performing a conversion process from a page description language format of data into raster image data, and a printing engine which continuously receives color image data having at least three color components in page unit and prints the at least three color components of color image data on a recording medium in parallel at a constant speed, the image processing method comprising the steps of:

receiving a page description language format of data including at least two of the at least three color components as at least an object constituting the page description format data;

analyzing the page description language format of data;

assigning, based on the analysis, each color component data of the object in the received data to each processor and causing the plurality of processors to perform the conversion processes of the data of the at least two of the at least three color components in parallel; and

producing raster image data of each color component from the plurality of processors to the printing engine in parallel.

2. An image processing method according to Claim 1, wherein said receiving step receives a page description language format of data including a plurality of pages, each page data having at least one object, and said assigning step assigns the objects of the plurality of pages to the plurality of processors so as for the plurality of processors to perform the conversion processes of the plurality of pages in parallel.

3. An image processing method according to Claim 2, wherein said producing step stores the plurality of pages of raster image data into a memory, and produces the stored raster image data in page unit to the printing engine.

4. An image processing method according to Claim 1, wherein the page description language format of data includes at least two of four color components as at least an object constituting the page description language format data, and wherein the printing engine continuously receives raster image data of the at least two of the four color components in parallel and prints them on the recording medium in parallel.

5. An image processing method according to Claim 3, wherein, in a case of assigning one object to one processor, said assigning step selects one of the plurality of processors, which finishes a conversion process of the object to raster image data earlier than others.

6. An image processing method according to Claim 5, wherein each processor having a queue for storing assigned objects as jobs of conversion processes, and said assigning step assigns each object to one of the queues of the processors, and each processor performs the conversion process based on information of the job stored in the queue.

7. An image processing methods according to Claim 6, wherein said assigning step assigns objects included in the received page description language format data without waiting to complete the conversion process of one page, and said producing step produces a page of raster image data stored in the memory in order.

8. An image processing method according to Claim 1, wherein said assigning step divides data of color components constituting one object as a job into each color component data, and assigns each color component data to the plurality of processors.

9. An image processing method according to Claim 1, wherein the printing system having a conversion unit converting, into raster image data, file data other than the page description language format data, and

wherein, in a case where the file data other than the page description language format data is received, said analyzing step recognizes, based on attribution information included in the received file data, that the file data other than the page description language format data has been received, and said assigning step assigns a job of the conversion process of the received file data to the conversion unit.

10. An image processing method according to Claim 9, wherein the file data is a Graphic Display Interface format of data.

11. An image processing method according to Claim 9, wherein the file data is an Extensible Markup Language format of data.

12. An image processing method according to Claim 1, wherein the printing system having a plurality of image-forming sections for forming images in multiple colors, and image-forming controller unit for controlling image-forming operations in the plurality of image-forming sections, and a data-supplying controller unit for controlling operations for supplying image data for the individual colors to said image-forming controller unit, said data

supplying controller including the plurality of
processors, and wherein the data-supplying controller
including the plurality of processors, and wherein the
data-supplying controller unit sequentially supplies
5 the image data for the individual colors to the image-
forming controller unit with timing that allows the
images for the individual colors to be overlapped and
formed in the plurality of image-forming sections on
the basis of a vertical synchronizing signal inputted
10 from a vertical synchronizing signal line, the number
of which is fewer than the number of the
aforementioned image-forming sections.

13. An image processing method according to
15 Claim 12, wherein, in the printing system, a single
piece of the vertical synchronizing signal line is
provided.

14. An image processing method according to
20 Claim 12, wherein the timing is set in the data-
supplying controller unit as information about the
difference in time from the vertical synchronizing
signal.

15. An image processing method according to
25 Claim 12, wherein the timing is supplied from the
image-forming controller unit to the data-supplying
controller unit as information about the difference in
time from the vertical synchronizing signal, and
30 wherein the information is obtained according to the
amounts of color deviations among the individual
colors and measurement of the color deviations is
performed in the image-forming controller unit.

16. An image processing method according to
35 Claim 15, wherein the measurement of the color
deviations among the individual colors is performed in
response to a command transmitted from the data-

supplying controller unit.

5 17. An image processing method according to Claim 15, wherein the information about the difference in time from the vertical synchronizing signal, which is obtained according to the color-deviations among the individual colors, is supplied from the image-forming controller unit to the data-supplying controller unit via a serial communication line.

10 18. An image processing method according to Claim 15, wherein the information about the difference in time is supplied as information about a difference in time from a predetermined reference difference in time.

15 19. An image processing method according to Claim 14, wherein the information about the difference in time is set as the number of pulses of horizontal synchronizing signals outputted from the image-forming controller unit to the data-supplying controller unit.

20 20. An image processing method according to Claim 19, wherein the number of pulses is supplied as a difference in the number of pulses from a predetermined number of pulses.

25 21. An image processing method according to Claim 12, wherein, in the printing system, the plurality of image-forming controller sections comprises primary transcribing means for overlapping the individual color images and primarily transcribing the images on an intermediate transcribing belt and secondary transcribing mean for secondarily transcribing the overlapped images on a recording medium.

30 35 22. An image processing method according to

Claim 6, wherein each queue includes information indicating estimation time required in completing the assigned jobs by each processor, and wherein said assigning steps selects one of the plurality of processors, which the estimation time in the queue is shorter than others.

23. An image processing method according to Claim 9, wherein the conversion unit includes a video-graphics processing unit processing data for display, the video-graphics processing unit providing raster image data of a predetermined size, and wherein the conversion unit divides a page of data in the file data into a plurality of segments, and converts the segment data into raster image data, and said producing step combines the raster image data of the plurality of segments in to the page of raster image data.

24. An image processing method according to Claim 23, wherein the conversion unit assigns tag information into each segment data, and wherein said producing step performs the combining process based on the tag information.

25. An image processing method in a printing system receiving file data from an external terminal, converting the received file data to bit map image data by a plurality of processors, each processor performing a conversion process of an assigned job to bit map image data, and providing a plurality of page of bit map image data in order to a printing engine, the printing engine printing the provided page of the bit map image data at a constant speed on a recording medium, the image processing method comprising the steps of:

receiving a page description language format of data including attribution information from the

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~~external terminal, the attribution information~~
indicating at least a data structure of plural pages
in the received data and type of objects which
constitutes the page description language format data;

5 analyzing the attribution information
included in the received page description language
format data;

10 assigning each object in the received page
description language format data to the plurality of
processors as jobs of conversion processes
independently to a completion of the conversion
processes for one page;

15 receiving bit map image data of each job
from the plurality of processors irrelevant to a page
order and storing the received bit map image data from
the plurality of processors into a memory having a
memory capacity for storing plural pages of bit map
image data; and

20 producing the bit map image data stored in
the memory in page order to the printing engine.

25 26. An image processing method according to
Claim 25, wherein, in a case of assigning one object
to one processor, said assigning step selects one of
the plurality of processors, which finishes a
conversion process of the object to raster image data
earlier than others.

30 27. An image processing method according to
Claim 26, wherein each processor having a queue for
storing assigned objects as jobs of conversion
processes, and said assigning step assigns each object
to one of the queues of the processors, and each
processor performs the conversion process based on
35 information of the job stored in the queue.

28. An image processing method according to
Claim 27, wherein each queue includes information

5 ~~indicating~~ estimation time required in completing the assigned jobs by each processor, and wherein said assigning steps selects one of the plurality of processors, which the estimation time in the queue is shorter than others.

10 29. An image processing method according to Claim 25, wherein the printing system having a conversion unit converting, into bit map image data, file data other than the page description language format data, and

15 *ab* wherein, in a case where the file data other than the page description language format data is received, said analyzing step recognizes, based on attribution information included in the received file data, that the file data other than the page description language format data has been received, and said assigning step assigns a job of the conversion process of the received file data to the conversion unit.

20 30. An image processing method according to Claim 29, wherein the file data is a Graphic Display interface format of data.

25 31. An image processing method according to Claim 29, wherein the file data is an Extensible Markup Language format of data.

30 32. An image processing method according to Claim 29, wherein the conversion unit includes a video-graphics processing unit processing data for display, the video-graphics processing unit providing bit map image data of a predetermined size, and
35 wherein the conversion unit divides a page of data in the file data into a plurality of segments, and converts the segment data into bit map image data, and said producing step combines the bit map image data of

the plurality of segments into the page of bit map image data.

5 33. An image processing method according to Claim 32, wherein the conversion unit assigns tag information into each segment data, and wherein said producing step performs the combining process based on the tag information.

10 34. An image processing method according to Claim 25, wherein the printing system comprises a printing engine for continuously receiving color image data having at least three color components in page unit and for printing the at least three color components of color image data on a recording medium in parallel at a constant speed,

15 wherein said receiving step receives a page description language format of data including at least two of the at least three color components as at least an object constituting the page description language format data, and

20 wherein said assigning step divides the object of the at least two color components into each color component data, and assigns each color component data as an independent job to at least two of the plurality of processors so that the two processors independently convert that at least two color component data into bit map image data of the at least two color components in parallel.

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35 35. An image processing method in a printing system receiving file data from an external terminal, converting the received file data to bit map image data by a plurality of processors, each processor performing a conversion process of an assigned job to bit map image data, and providing a plurality of page of bit map image data in order to a printing engine, the printing engine printing the

provided page of the bit map image data at a constant speed on a recording medium, the image processing method comprising the steps of:

5 receiving a page description language format of data including attribution information from the external terminal, the attribution information indicating at least a data structure of plural pages in the received data and type of objects which constitutes the page description language format data;
10 analyzing the attribution information included in the received page description language format data;

15 assigning each object in the received page description language format data to each queue of the plurality of processors as jobs of conversion processes independently to a completion of the conversion processes for one page, each of the plurality of processors performing each conversion process of the assigned jobs in each queue;

20 receiving bit map image data of each job from the plurality of processors irrelevant to a page order and storing the received bit map image data from the plurality of processors into a memory having a memory capacity for storing plural pages of bit map
25 image data; and

producing the bit map image data stored in the memory in page order to the printing engine.

30 36. An image processing method according to Claim 35, wherein, in a case of assigning one object to one processor, said assigning step selects one of the queues of the plurality of processors, which finishes a conversion process of the object to raster image data earlier than others.

35 37. An image processing method according to Claim 35, wherein each queue includes information indicating estimation time required in completing the

assigned jobs by each processor, and wherein said assigning steps selects one of the plurality of processors, which the estimation time in the queue is shorter than others.

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38. An image processing method according to Claim 35, wherein the printing system having a conversion unit converting, into bit map image data, file data other than the page description language format data, and

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wherein, in a case where the file data other than the page description language format data is received, said analyzing step recognizes, based on attribution information included in the received file data, that the file data other than the page description language format data has been received, and said assigning step assigns a job of the conversion process of the received file data to the conversion unit.

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39. An image processing method according to Claim 38, wherein the file data is a Graphic Display Interface format of data.

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40. An image processing method according to Claim 38, wherein the file data is an Extensible Markup Language format of data.

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41. An image processing method according to Claim 38, wherein the conversion unit includes a video-graphics processing unit processing data for display, the video-graphics processing unit providing bit map image data of a predetermined size, and wherein the conversion unit divides a page of data in the file data into a plurality of segments, and converts the segment data into bit map image data, and said producing step combines the bit map image data of the plurality of segments into the page of bit map

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image data.

5 42. An image processing method according to Claim 41, wherein the conversion unit assigns tag information into each segment data, and wherein said producing step performs the combining process based on the tag information.

10 43. An image processing method according to Claim 35, wherein the printing system comprises a printing engine for continuously receiving color image data having at least three color components in page unit and for printing the at least three color components of color image data on a recording medium in parallel at a constant speed,

15 wherein said receiving step receives a page description language format of data including at least two of the at least three color components as at least an object constituting the page description language format data, and

20 wherein said assigning step divides the object of the at least two color components into each color component data, and assigns each color component data as an independent job to at least two of the plurality of processors so that the two processors independently convert the at least two color component data into bit map image data of the at least two color components in parallel.

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